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1.0 Introduction to Painter Power and Description of Menus

A series of menus give you access to all of the programs and options in this package. All menu selections are made with a single keystroke and should not be followed by a carriage return. When data requiring more than one keystroke is requested, a carriage return must follow the data. Entering the keyword 'ERR' will cause the program to back up one step. All programs in the package will terminate if you hit the control-C character, unless another option for ending the particular program is explicitly shown. In programs where it is convenient or necessary to be able to 'get out' quickly, the carriage return functions like control-C.

Each of the menus allows you to view the hi-res screens from the menu. Hitting any character gets you back to the menu.

1.2 Specifying Disk Files

At various points in this package you are asked for the name of a disk file. Painter Power maintains 3 types of files: 1) Picture files, with '.PIC' on the end of filename, 2) Pattern Set files, with '.SET' on the end of the filename, and 3) Single Pattern files, with a filename extension '.PAT'. When you are asked for a filename for any of these 3 file types, type only the filename and do not include the extension. If the file is on a different disk drive, type the filename and disk drive in quotes, separated by a comma. For example: "JUNKFILE,D2". If you have chosen the delete file option, then you must specify the full name of the file (include the extension). The delete file feature will work on non-painter power files as well.

2.0 Program Selection

The Program Selection is the primary menu of the Painter Power package. All programs in the package are selected from, and return to, the Program Selection.

2.1 View Current Picture (Option 1)

This feature allows you to peek at the current hi-res picture. When you first boot Painter Power, this picture will show what was in memory at the time of booting. After you have created a picture, this feature is useful for peeking at what you created without having to return to the particular program which created it.

2.2 Save Current Picture (Option 2)

This feature allows you to save the current picture on either disk drive. Normally this is done while you are in Painter Power or Painter Power Advanced. The feature is provided on the Program Selection in the event that you inadvertently exit from one of these two programs. The save picture option may also be used in conjunction with the load picture option (2.3) to transfer pictures from one disk to another.

2.3 Load a Picture from Disk (Option 3)

This feature allows you to load a hi-res picture from either disk. This is useful if you have perhaps forgotten what a particular picture looked like. It is also useful for moving pictures from one disk to another.

2.4 Display Catalog of Disk Files (Option 4)

This feature allows you to do a DOS catalog of either disk.

2.5 Delete a Disk File (Option 5)

This feature allows you to delete any file on either disk. Used in conjunction with the save, load, and catalog features, you can arrange pictures on a disk for a slideshow.

2.6 Run Painter Power Beginners (Option A)

This selection loads the Painter Power program from disk 1 and runs it. It erases the current hi-res picture. See chapter on Painter Power -beginners.

2.7 Run Painter Power Advanced (Option B)

This selection loads the Advanced Painter Power program from disk 1 and runs it. It erases the current hi-res picture, but does not erase any patterns created from a previous run of Painter Power Advanced. See chapter on Painter Power Advanced.

2.8 Create a Slide Show (Option C)

This selection calls up the Slidemaker program from disk 1. Slidemaker allows you to create free running slideshows from pictures that you have stored on disk. See chapter on creating slide shows.

2.9 Run a Slide Show (Option D)

This selection calls up the Slideshow program from disk 1. Slideshow allows you to verify and then run a slideshow that you created with the slidemaker program. See chapter on running a slideshow.

3.0 Painter Power Beginners

3.1 What Does Painter Power Do?

The basic idea of Painter Power is: 'Be able to paint in different colors with a brush of your own creation.' Painter uses English directives to guide you in the use of Painter Power to accomplish this end. The next few sections will reveal the nitty-gritty of entering & painting with brushes, clearing & changing background colors, and using Painter to produce certain kinds of pictures.

3.2 Understanding Your Paddles

One of your paddles is 'right and left', and the other is 'up and down' (also known as horizontal or X, and vertical or Y). Together the paddles may seem like a paintbrush, but it is only so in that when you move the vertical paddle up, whatever is being drawn goes up as well. The similarity ends there. Painter Power reads how far to jump, not how far to walk. So when you have the vertical paddle turned all the way the right, it takes a big jump upward, skipping spaces in between. It doesn't 'walk', hitting every space between where it was and where it is jumping to. The biggest jump you can put in is 2 points, in both directions. Remember this when you move the paddles around: if you hold them near the center of their range (see the grid below), Painter Power will read small jumps. If you hold them near the end of their range, it will read big jumps. Let's go make some squiggles.

3.3 Starting Painter Power

First of all, we have to get Painter running. From the Program Selection choose Painter Power. You can alternate between Painter's instructions and this manual as you get to know Painter. After reading the basic instructions, you must decide what background color you want. So choose one of the 8 colors. If you want to change the background later, you'll be able to jump back to this menu by hitting the ESC key, select a different color, and jump back into Painter. After you choose a color, the screen will clear and be replaced by a brush with some instructions below.

3.4 Making a Brush

So now hit 'M' to 'M'ake the new brush. Use the space bar to start making the brush. The space bar can always be used to tell Painter Power to stop until you hit the space bar again. Now if all you see is a dot, it means that your paddles are sitting dead center and Painter Power isn't reading any jump from it. So move them! Now when you see a brush that you sort of like (you'll get to know what kinds of brushes get interesting results - be patient), hit the 'M' key again. If things are moving too fast, hit the 'T' key for 'T'urtle. If things are going to slow, you may speed them up with 'R'abbit and 'B'litz. If you want to go one dot at a time, you can select 'S'nail. Each time you want to enter another dot onto the brush, hit the space bar. If you don't like the brush at all, and you want it to start over, hit the 'M' key again. Don't spend too much time trying to make complicated brushes. You'll find that it is the simple ones that get most of the interesting results, especially in the beginning. Try entering a line with one or two bends in it. You may also use the keyboard to enter a pattern. By hitting the V, N, G, and J keys you can go up, down, left or right. The H key 'H'olds at the current screen location. If you have stopped Painter Power with the space bar, or you are on Snail speed, the V, N, G, and J keys can be used to

add one point at a time to the brush. To transfer control back to the paddles, hit the '/' key.

3.5 Painting with a Brush

After you have finished making your brush, hit the 'P' key to start painting. Take a moment to read the directions at the bottom of the screen. To start painting, you must put the brush down. This is done with the 'u' key. You can lift the brush up again and move it to a different place by hitting the 'U' key again. Try clearing the screen with the 'C'lear key and changing the painting speed with the 'B'litz, 'R'abbit and 'T'urtle keys. You may use the keyboard to steer the brush in the same way that you used it to make the brush. For very exacting work, you can use the keyboard in conjunction with 'S'nail speed. When you are in 'S'nail mode, you can make the brush advance quickly in one direction by using the repeat key. Painter Power will sound a click each time it advances the brush. If you want to change the background color, press the Esc key and select a new color for the background. If you hit Esc accidentally, Painter will let you press the Return key to resume what you were doing and not lose your picture.

Note: If at any time you appear to be stuck, you probably hit the space bar to stop what was going on, switched to a different mode, and forgot to hit the 'Sspace bar ' key again to start up the new activity. So whenever you think you are stuck, try hitting the space bar. If that doesn't work, it may be that you are painting with the same color as the background and therefore are not seeing any change on the screen. In this case, select a different color.

3.6 Controlling the Wraparound

You've probably noticed that when the brush goes off one edge of the screen, that it comes back on the opposite edge. This is known as 'wraparound', and it can be controlled with the 'W' key. To turn the wraparound off, hit the 'W' key. It can be subsequently turned back on by hitting the 'W' key a second time. When the wraparound is off and you steer the brush off one edge of the screen, it will reappear on the opposite side, but it will not leave a trail. To get the brush to paint again, you must steer it back onto the screen by directing it in the opposite direction from which you left the screen. Sometimes it happens that you lose track of where you left the screen. If this happens, you can force the brush back onto the picture by hitting the 'B' key. This will cause the brush to reappear at the center of the picture. Turning the wraparound on again also forces the brush onto the picture.

3.7 Weaving a Carpet

Go back to 'Make' brush mode by hitting the 'P' and 'M' keys. You don't have to hit the space bar when switching modes. The space bar need only be used as a pause for stopping and then continuing whatever is going on without affecting anything. Use the space bar when it's time for dinner; have your meal, and come back to resume exactly what you were doing before. Enter a brush that looks something like the one below. Make sure to keep the dots close together. When you've got something that looks reasonable, hit the 'M' key, and then the 'P' key to paint. You'll probably want to clear the screen, so hit the 'C' key. Set your horizontal or right-left paddle in the middle of its range so that the brush isn't going sideways at all. Then set your vertical paddle just enough to the right of center so that the brush begins to move up. If it's going too slow, hit the 'R' key for 'Rabbit'. As the brush progresses upward, strike the color keys to change colors and presto! - computer carpet. The color keys are:

1 - Green 2 - Purple 3 - White 4 - Orange 5 - Blue 6 - Black

3.8 Making Mountains

Go back to 'M'ake brush mode. The first ingredient in mountain making is a bumpy brush going from one side of the screen to the other. Set the right-left paddle so that the dot is moving one way or the other, a space or two at a time. Then use the up-down or V paddle to make the bumps. Once again, hit the 'M' key when you like the brush, and use 'P' to paint the mountains. Unlike the carpet, there is no best way to move the paddles to get quality mountains. You might try this approach to mountain-painting: Set your up-down paddle so that the mountain brush is moving up the screen. As it moves up, move your right-left paddle back and forth at different rates with one hand while you switch between 2 or more colors with the other hand. Once in a while change the up-down paddle so that it moves the mountain brush at a different rate. If you set the up-down paddle in the middle, it will keep the mountain brush at the same level on the screen so that you can emphasize the brush at that level using the right-left paddle. Remember, if you don't like what is coming out, just hit 'C' to clear. And if you don't like the background color, hit Esc, select another color, and then you'll be back where you were before with your mountain brush still intact. And don't forget: If you hit the space bar, you have to hit the space bar again to resume.

3.9 Disappearing Lines

Now we're getting tricky. Enter a small vertical line as the brush. Get back to 'P'aint mode, and set the paddle so that a solid bar of color is being drawn across the screen. Now start moving the up-down paddle up and down while changing the colors. When the bar comes back around over its previous trace, it will create a sort of weave. The more you change the colors, the more intricate the weave becomes. The trick is to make the bar disappear at one point and reappear dramatically at another point not too far away. The way you do this is by hitting the 'U' key when you want it to disappear, letting the bar move across the now blank screen to the point where you feel it should reappear, and then hit the 'U' key again. After a few attempts you'll get the hang of it.

3.10 Forward and Back Arrow Keys - Editing Your Brush

When you hit the back arrow key, it removes one point from your brush. When you are making a brush, this feature can be used to go back one or more points if you made a mistake. This is particularly useful if you are in Snail speed.

When you hit the forward arrow key, Painter Power adds one point to your brush. When you are making a brush, this causes Painter Power to add the point that was stored in memory. Thus you can 'get back' and selectively edit a brush that you had previously created.

3.11 List of Painter Power Beginners Commands

Keystroke	Explanation
Space	Pauses/restarts whatever Painter is doing at the moment.
'M'	Allows you to start & stop 'M'aking a new brush.
'P'	Gets you in and out of 'P'ainting with the current brush.
'T'	Tells Painter to slow down to 'T'urtle speed.

'R'	Tells Painter to speed up to 'R'abbit speed.
'B'	Tells Painter Power to speed up even faster to 'B'litz speed.
'C'	Clears the screen to the current background color.
Esc	Allows you to select a new background color or end Painter.
'Y'	Go up
'N'	Go down
'L'	Go left
'J'	Go right
'H'	Hold
'/'	Restore control of the brush to the paddles.
'@'	Force the brush back to the center of the picture.
'W'	Turn wraparound on/off.
'U'	Lift brush up/down.
'1'	Paint in green.
'2'	Paint in purple.
'3'	Paint in white.
'4'	Paint in orange.
'5'	Paint in blue.
'6'	Paint in black.
'==>'	Add one point to the brush.
'(=='	Remove one point from the brush.

4.0 Painter Power Advanced

Painter power Advanced offers much greater control and flexibility over Painter Power Beginners. You may work with one of any eight brushes. You can direct the program to use the shape of one pattern to control the movement of the currently selected brush. You can visualize the motion that the brush will follow before actually directing the program to paint with that motion. You can control the size of the brush and the stroke using the paddles. You can use the paddles to select the current paint color from a palette of 8 colors that you designate. You can tell the program to return to a given screen location at the touch of a single key. You can create brushes with large gaps so that you can easily paint streaks. You can select different painting modes which tell the program to darken, lighten or complement the portion of the picture over which the brush passes. You can create patterns using mathematical functions, thereby permitting you to use curved patterns that would be difficult to enter manually. You can create patterns that are made up of portions of other patterns, and then use that pattern as a brush or as a stroke.

Painter Power Advanced is divided into 4 sections: The Set-Up Menu, Graphics, Math Menu & Disk Menu. The Set-Up Menu is used to make selections that affect the Graphics. Graphics mode is where you do all of your painting. From the Set-Up Menu you can also branch to the Math and Disk Menus. The Math Menu allows you to specify which math function to use to compute a pattern. The Disk menu allows you to store & retrieve patterns & pictures from the disk.

4.1 The Set-Up Menu

After you have called for painter Power Advanced from the Program Selection, the Set-Up Menu will appear on your screen. When you select one of the numerical selections, the line you specified will be shown at the bottom of the screen. The cursor will be positioned over the current setting of the item described by the line. You may then change that setting by selecting one of the values highlighted on that line. The change will be put into effect immediately. The cursor will remain at the same spot should you wish to change the setting again. If not, you may hit the return key to get back to the main selection. If you wish to go to the previous option line, press the back arrow key. If you wish to go to the next option line, press the forward (right) arrow key. The appropriate line will appear at the bottom of the screen and you may then change the setting of that item.

In order to start or resume the Graphics mode (in which you do all of your painting), select option A. For convenience, the return key also serves to select option A when you are at the main selection. When you are in Graphics mode, you may return to the set-up menu by pressing the return or Esc keys. If you hit the Esc key, the text of the Set-up menu will be restored on the screen and you will be at the main selection of the Set-Up menu. If you hit the return key, the picture will be left on the screen so that you can see the effect of changing the various Set-Up Menu items, but you will still be returned to the main selection of the Set-up Menu. In this case, the entire interaction with the Set-Menu will take place on the bottom line of the screen. If you need to see the text of the menu, you may hit the Esc key at anytime while in the Set-Up menu, and the text screen will be restored. Whenever you return to the Set-Up Menu, Painter Power turns off the brush (section 4.2.3), returns to the monitor screen (section 4.2), and turns visualize mode off (section 4.2.13).

If you select Set-Up Menu options B or C, the text screen will be replaced with the text of the Math or Disk Menus. You may then work with the selections available on those menus, and return to the Set-Up Menu using the Z option available on those menus. When you select either of option D, your Painter Power diskette must be inserted in drive 1 in order that the computer be able to

access the necessary program files.

4.1.1 Background Color Selection (Option 1)

Press the key corresponding to the background color you wish, from the table below. The picture screen will immediately be cleared to that color.

1 - Green	2 - Purple	3 - White II	4 - Orange
5 - Blue	6 - Black I	7 - White I	8 - Black II

The Apple has two color 'families'. When you mix colors from these two families, the result can be distorted, depending upon what type of painting you are doing. This distortion can be put to good use, but it is a matter of taste. The two families are:

Family 1:	1 - Green	2 - Purple	3 - White I	8 - Black I
Family 2:	4 - Orange	5 - Blue	6 - Black II	7 - White II

4.1.2 Brush Selection (Option 2)

The brush can be any one of the eight patterns. When you select the pattern, the number of points in the pattern will be shown to the right of the control display entry 'BRSIZ', provided that the brush sizing mode is normal (see section 4.1.4). If the graphics is displayed, then the new brush that you selected will be displayed on the screen.

4.1.3 Stroke Selection (Option 3)

The currently selected stroke determines where the program will get the information to control the movement of the brush. From the Set-Up Menu you can specify that this information come from one of the eight patterns, or that it come from the paddles. When you first come to the Set-Up Menu, the stroke selection is set to the paddles. Keyboard control of the brushes movement is specified when you are in Graphics, and selection of the keyboard overrides the stroke selection made in the Set-Up Menu (see sections 4.2.5 & 4.2.6, keyboard control). When control from the keyboard is released, it returns to whichever selection was made in the Set-Up menu.

The size of the currently selected stroke is shown to the right of the control display entry 'SSIZ' (for stroke size), provided that the stroke sizing mode is normal (see section 4.1.5), as it is when you first enter the Set-Up Menu.

4.1.4 Brush Size Control (Option 4)

The size of a brush is the number of points it contains. When you create a brush, it has a fixed or inherent size. When the brush size control is set to normal, the program always uses this inherent size when displaying or painting with the brush. This size is always displayed in the control display entry 'BRSIZ'. When the paddles are used to control the size of the brush, this inherent size is overridden, and the program displays or paints with that portion of the brush indicated by the selected paddle. This feature allows you to control the portion of the brush being painted with the selected paddle, as you are painting. If you selected paddle 3 to control

the brush size, and paddle 3 was set to 50 (each paddle has a range of 1-255), then the first 50 points of the currently selected brush would be used, and the number 50 would be displayed in the control display entry 'BRSIZ'. If this brush was created with only 30 points, then an additional 20 'garbage points' would be displayed following the brush. These 'garbage points' would consist of whatever was in memory at the time the brush was selected. These 'garbage points' can be avoided by limiting the setting of the paddle to the number of points originally contained in the brush. However, you may find that these garbage points can provide some very interesting and unexpected results.

The brush size control also plays an important role when you create a brush. If the control is set to Normal, then the program will allow you to create a brush of up to 255 points (when it reaches 255, it will start over from 0). However, if the brush size is being controlled by a paddle, the size of the brush is 'locked' to the number of points specified by the paddle. In this mode, a brush is displayed whose shape is constantly being changed. This produces an extraordinary effect which should be tried (see section 4.5.4).

4.1.5 Quickstroke Size Control (Option 5)

The quickstroke size is the number of points in the current quickstroke (see sections 4.2.13 - 4.2.15). If you invoked a quickstroke, the brush would be moved along the quickstroke for the number of points equal to the quickstroke size. The Quickstroke Size Control functions similarly to the Brush Size Control, with the difference being that it is the size of the quickstroke that is being controlled. In Normal mode, the quickstroke size is equal to the number of points in the currently selected stroke pattern (see section 4.1.3). When the quickstroke size is being determined by one of the paddles, the setting the paddle determines the number of points that will be used.

When the currently selected stroke is the paddles, the quickstroke size is set to 32 points if the control is set to Normal. This means that up to 32 points may be entered with the paddles, to be used as a quickstroke. If the control is set to a paddle, then the number of points that can be entered as a quickstroke is determined by the setting of the paddle.

When the currently selected stroke is a pattern, the quickstroke size is set to the inherent size of that pattern if the control is set to Normal. If the control is set to a paddle, then the quickstroke size is set equal to the setting of the paddle.

4.1.6 Color Selection Mode (Option 6)

This feature allows you to use either the keyboard or the paddles to select the current paint color. When you first enter the Set-Up Menu, control is set to the keyboard, and the keys 1-8 are used to select the 8 different colors (see table below). If the control of color selection is set to one of the paddles, then the setting of the paddle determines the color. Since the paddles give a range of 1-255, the program divides the paddle setting by 8 to get 8 possible color selections. The color contained in the Color Table entry indicated by this number is then used as the paint color (see next section for explanation of the Color Table).

4.1.7 Color Table (Option 7)

The Color Table determines what paint color will be used for a given setting of the paddle assigned to color control (see previous section). Normally the Color Table is set up such that the

paint color used will be equal to the paddle setting. That is, when the paddle setting is 3, the paint color used would be 3. By changing the entries in the Color Table, it is possible, for example, to set things up so that green would be used for paddle setting 1-4, blue for paddle settings 5 & 6, black for paddle setting 7, and white for paddle setting 8. This arrangement would allow you to smoothly alternate from green to blue to black to white and back. This would not be possible if the Color Table were not altered, since it would be necessary to go through intermediate colors to get to the desired color. It would also be impossible to use the keyboard to get the same smooth and rapid control over color transitions that a paddle can give.

Note: There is a slight limitation when using the paddles to control the color when the speed is 'B'litz. The limitation is that the color may only be changed once for every 4 points drawn, no matter how quickly you adjust the paddle.

4.2 Painter Power Advanced Graphics (Option A or Carriage Return)

Painter Power Graphics makes use of the keyboard, paddles, 2 hi-res screens, and the 4 text lines at the bottom of the screen. If you are familiar with Painter Power Beginners then you may immediately start to use Painter Power Advanced since all of the options of the Beginner version are present in identical form in the Advanced version, with two exceptions: The extended screen, used when painting with wraparound off, is -512 to +511 in both directions for the Painter Power Advanced, while only -256 to +255 in both directions for Painter Power Beginners. This allows very large brushes to be used without wrap around problems. The second difference is that in order to reassign control of the pattern to the paddles after having assigned control to the keyboard, you must hit the 'Z' and 'X' keys instead of the '/' key (see sections on Kb-Hold & Locate, 4.2.5 and 4.2.12).

Usage of Hi-Res Screens - Monitor and Picture Screens

Painter Power Advanced uses one hi-res screen to display the currently selected brush (or quickstroke -see section 4.2.13) against a black background. It uses the other to display the picture that you are painting. The former screen, called the monitor screen in this text, is used to compose patterns to be used as brushes and/or strokes. The latter, called the picture screen, is used to create a picture. In the course of creating a picture, one normally jumps back and forth between the two screens as new brushes and strokes are designed and used in painting. It should be understood that the options that Painter Power presents does not depend upon what screen is displayed; the options are the always the same.

Usage of Text Lines -Control Display Description and Usage

The 4 text lines, called the control display, serve to indicate the various modes and settings that are in effect at any given time. The letter following the name of each mode is the keyboard character that must be hit in order to switch the mode on or off. When the character is displayed in black on white (inverse), the associated mode is on. The only exception to this is the painting mode (PMODE), and that is described in section 4.2.10. Following is a description of each item in the control display, going from left to right, top to bottom.

+xxx, +yyy	This setting shows the next vector that the program will use. How it will be used depends upon what you are doing at the time: If you are creating a brush, it indicates where the next point of the brush will be in relation to the last
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point. If you are painting with or simply moving a brush, then it indicates how far the brush will move from its current screen location. If you are creating a quickstroke, then it indicates where the next point of the quickstroke will be in relation to the last point.

+xxx, +yyy	This setting shows the current screen location of the starting point of the brush. If you are on the picture screen, and the wraparound control is off (see section 4.2.11), then the program will permit the brush to be moved off of the normal screen, whose dimensions are 0-255 horizontal by 0-127 vertical. When the brush is moved off of the normal screen, it moves onto a larger screen which is not displayed, but whose dimensions are -512 to +511 horizontal, and -512 to +511 vertical. When either the horizontal or vertical location is off the normal screen, it will be displayed in inverse as long as no part of the brush is still on the normal screen. In other words, if either of the horizontal or vertical locations is displayed in inverse, it means that the brush is fully off of the normal screen.
BRG12	Current size of brush
QSG12	Current size of quickstroke
VISUALIZE	When visualize mode is on, the current quickstroke is displayed. If quickmode is on, the quickstroke is then updated, at the rate of the currently selected speed.
LOCATE	When locate mode is on, the paddles or keyboard can be used to locate the brush (or quickstroke) anywhere on the screen. If you are making a pattern, turning locate on will allow you to locate where you wish the next point in the pattern to be.
STOP	When stop is on, the creation or movement of any pattern is stopped. Turning stop off resumes whatever was going on, provided that no changes to the previous mode were made while stop was on.
PAINT	When paint is on, the picture screen is displayed. When paint is off, the monitor screen is displayed.
QUICKMODE	When quickmode is on, changes may be made to the quickstroke, provided that visualize mode is on.
KB-HOLD	The horizontal and vertical components of the current vector may be frozen independently at their current value, and then changed through other keyboard commands. When I is displayed in inverse, the horizontal component is frozen, when V is displayed in inverse, the vertical component is frozen.
COLOR	The current paint color. 1-Green, 2-Purple, 3-White I, 4-Orange, 5-Blue, 6-Black II, 7-White II, 8-Black I
BRG-UP	When on, the brush is down.
WRAPAROUND	When wraparound is on, directing the brush off one end of the screen will cause it to continue painting on the opposite edge of the screen.
REVERSE	When the current stroke is a pattern, then an inverse ',' indicates that the

horizontal component of each vector or step from that stroke is being reversed. When inverse '.' is displayed, the vertical component is being reversed.

MAKE When make mode is on, a pattern is being created. When off, a pattern is being moved/painted.

PMODE The character displayed is the current painting mode. The normal painting mode is ! (see section 4.2.10).

4.2.1 Working with Painter Power Advanced Graphics

This program is written to allow as much flexibility as possible. This means that once you know the program well, you can find new ways to use it all the time. It also means that the novice can easily get into a situation where something is happening (or not happening) on the screen for which there is no ready explanation. The key to gaining a basic understanding of the program is to start simple, try out one feature, learn it, turn it off, try a second feature, and so on. Once you have gone through the features, you can start to combine them.

The following sections describe each feature. Each section also describes what other features are related, and how the group of features may be applied. Before going on to these descriptions, let us define a simple starting point to which you can always return.

When you at first enter Graphics from the Set-Up Menu, without having changed any of the Set-Up Menu's initial settings, all mode selections and settings will be pre-set to a certain set of conditions. The monitor screen will be displayed, with the number one brush displayed on the screen, still. The only control display items displayed in inverse will then be the Stop mode and wraparound mode. From this state you will be able to explore each of Painter Power Advanced features. To return to this state you need only turn all modes off except for Stop and Wraparound. This is easily done by hitting the character displayed to the right of each item in the control display.

4.2.2 Making a pattern - 'M' key

To make a pattern, press the M key, enter a series of vectors, and press the M key when the desired pattern has been entered. The rate at which the vectors are entered into the pattern is determined by the current speed setting. You may change the speed setting at any time.

The series of vectors that you enter can come from the keyboard, the paddles, another pattern, or the quickstroke. You may alternate between these sources of vectors (really sources of movement) as you enter the pattern although this is typically not done.

Entering a Pattern from the Keyboard

To enter a pattern from the keyboard, use the Y,N,G,J and H keys. You may use the control key in conjunction with Y,N,G and J to increase the separation between the points being entered. For example, each time you hit ctrl-Y, 1 is added to the vertical component, causing the next point to be located one screen location further upward than it would have been. See section 4.2.5 for more details. You may elect to control only the horizontal or vertical component of the vector being entered, and allow the current stroke (which would be the paddles or a pattern) to supply the

opposing component. You may use the Reverse horizontal and Reverse vertical keys (',' and '.')

 to reverse the horizontal and vertical components. This is useful for entering zig zag patterns.

Creating a Pattern with the Paddles

To enter a pattern from the paddles, use the first paddle (paddle 1) to control the horizontal movement and paddle 2 to control the vertical. It is possible to enter one component using the associated paddle, and to enter the opposing component using the keyboard. This is done by pressing the Z or X key to transfer control of the horizontal or vertical component to the keyboard. The opposing component still changes with the paddle.

Creating a Pattern from Another Pattern

To make a pattern from another pattern, you must return to the Set-Up Menu with the Esc or Return keys, select option 3 (Stroke), and select which pattern to use. After returning to Graphics using the return key, make sure that Stop is off. Then hit 'M' to initiate entry of the source pattern into the pattern you are creating. When the portion of the source pattern that you wanted has been entered, hit 'M' again. While the pattern is being created you may want to make it zig and zig a little. Use the Reverse Horizontal and Vertical keys for this (',' and '.'). For instance, hitting ',' would cause the pattern to go right if it were going left.

Using Quickstrokes while Creating a Pattern

You may also cause the current quickstroke to be added as part of your pattern. Simply hit the Execute Quickstroke key (';') whenever you want to include the quickstroke. You may do this in the midst of any of the previous three methods of pattern creation.

Setting a Return Point Within a Pattern

While creating a pattern, you may use the 'I' key to specify a point to which you wish to return to during creation of the remaining portion of the pattern. Hitting the 'I' key will sound a blip sound. To return to that point later in the pattern, hit the 'Q' key. Each time you begin creation of a pattern this return point is reset to the beginning of the pattern.

Creating Segmented Patterns

The Locate feature (section 4.2.12) may be used to create segmented patterns. While creating a pattern as above, hit the 'L' key. You may then relocate the last point entered to any location the screen. After you turn off Locate, creation of the pattern will resume from that point. To control this relocation you may use the paddles or the keyboard. To use paddles, hit the '/' key. To use the keyboard, use the V, N, G, J and H keys. The Locate feature may be used in conjunction with any method of pattern creation.

4.2.3 Painting a Picture & Brush Up/Down - 'P' and 'U' keys

The 'P' key may be used to toggle between the picture and monitor screens. When Paint is on, the picture screen is displayed. In order to paint, you must put the brush down. When an inverse 'U' is displayed, the brush is down. However, painting will only occur if you are on the normal

screen (not on the extended screen -see section 4.2.11), are not in Locate or Visualize modes, and are not stopped. (There is an exception to the last three conditions, and that is when executing a quickstroke, in which case all three conditions are overridden -see section 4.2.15).

Whenever you come back into Graphics from the Set-Up Menu, the brush is automatically lifted in order to protect against accidental painting. In Painter Power Beginners, the brush was also lifted each time the picture screen was invoked. This is not done in Painter Power Advanced, so that you may toggle between the monitor and picture screens with no change to the brush up/down status. You are also returned to the monitor screen when you return to the Set-Up Menu.

4.2.4 Setting the speed -'B'litz, 'R'abbit, 'T'urtle & 'S'nail

You may change Painter Power's speed of execution at any time by hitting the 'B', 'R', 'T' or 'S' keys. The 'S' speed is different from the first three in that it is really a manual mode of operation in which Painter Power automatically turns Stop on immediately after it has painted the brush once or entered one point in a pattern. Each time you must turn Stop off (or resume) with the space bar. You may also use the N,G,V and J keys to cause Painter Power to advance one point in the specified direction. Use of the repeat key when in Snail speed gives you rapid and exact control over the program.

4.2.5 Keyboard Control - Kb-Hold - 'Z' and 'X' keys

The Z and X keys are used to hold the horizontal and/or vertical components of all subsequent movements, and to allow further keyboard control of these components through the V,G,N,J and H keys. The Z and X keys act in an override capacity; that is, they override the currently selected stroke, whether it be a pattern or the paddles. For example, when Hold Horizontal ('Z') is turned on, the current horizontal component is frozen, while the vertical component is left to vary with the current stroke. This horizontal component can then be incremented or decremented using the ctrl-J and ctrl-G keys (see next section). In order to restore control of the horizontal component to the current stroke, the 'Z' key would be hit again. By turning the Hold Horizontal and Hold Vertical keys on and off, portions of the current stroke can be suppressed. This is especially interesting when the current stroke is one of the curved patterns computed using the Math Menu (see section 4.5.9 for more details).

4.2.6 Keyboard Control - 'Y','N','G','J' and 'H' Keys

The Y, N, G, J, and H keys cause the current stroke to be overridden and the vector to be used next to be set as follows: Y-up one, N-down one, G-left one, J-right one, and H-hold. When any of these keys are hit, Hold Horizontal and Hold Vertical ('Z' and 'X') are automatically turned on so that control of the brush is relegated to the keyboard. Section 4.5.1 gives as an example of how to use these keys to create a staircase pattern.

When the control key is pressed together with Y,N,G or J (not H !!) it directs the program to alter the vector to be used as follows: Y-add one to the vertical component, N-subtract one from the vertical component, J-add one to the horizontal component, and G-subtract one from the horizontal component. Use of the ctrl-J and ctrl-G keys is only permitted if Hold Horizontal is already on. Use of ctrl-Y and ctrl-N requires Hold Vertical to be on. When the repeat key is used in conjunction with these latter 4 keys, the resulting large vector cause the brush to be repeated very rapidly all over the screen, giving a dazzling effect. See section 3.5.10.

4.2.7 Keyboard Control - Reverse Horizontal and Vertical - ',' and '.' Keys

The Reverse Horizontal and Reverse Vertical keys (',' and '.') are used to reverse the direction of the current stroke. The action of these keys depends upon whether the current stroke is a pattern and whether Hold Horizontal or Hold Vertical are on. For example, if ',' is hit and Hold Horizontal is on, then the direction of the current horizontal component is reversed. In other words, left is turned into right, and right to left. If the current stroke is a pattern and '.' is hit, then the sense of the horizontal component of each vector of the pattern is reversed. This reverse feature can be used to make patterns fold back on themselves or to zig-zag.

4.2.8 Stop/Resume Execution - Space Bar

When Painter Power is stopped, it ceases any movement on the screen. Subsequent hitting of the space bar resumes what was happening previously. The space bar can be used to stop a process, change modes, and resume in the new mode. Certain keys temporarily override the Stop mode. Hitting V,N,G, or J will cause Painter Power to jump one point in the direction indicated, and then to stop again. The ';' or '+' keys will cause Painter Power to execute the current quickstroke and to Stop when it is complete. The relocate keys '0' (section 4.2.17) and '8' (section 4.2.19) will function even when Stop is on. When stopped, the 'H' key will cause the pattern to be drawn at the current location, provided that the brush is down. This is useful if you wish to paint the brush only once at certain locations on the screen. You simply move the brush to where you want it, turn Stop on, put the brush down with the '0' key, hit 'H', lift the brush up and move the brush to the next place.

When exiting to the Set-Up Menu, Stop is automatically turned on.

4.2.9 Paint Color Selection - '1','2','3','4','5','6','7','8' Keys

Keys 1 thru 8 are used to select the paint color. If the color selection mode is set to one of the paddles (section 4.1.6), then hitting any of these keys will have no effect. The color that is actually painted onto the picture depends upon the painting mode, described in the next section. Normally the paint mode is set to normal ('!'), which means that the selected color is what actually appears on the screen. It must be added that due to the Apple's hi-res color limitations, distorted colors may be painted onto the picture. This is mostly due to painting colors of opposite color families on top of one another (see section 4.1.1).

4.2.10 Painting Modes - '!', '@', '#', '\$', and '%' Keys

The 5 painting modes affect the way the brush paints onto the picture underneath it. The following list describes each painting mode.

- '!' This is normal painting mode in which the currently selected color is painted onto the screen.
- '@' In this mode, no change is made to the screen. This painting mode is useful when switching back and forth between painting modes rapidly in order to selectively change parts of the picture.
- '#' In this mode, black portions of the picture are changed to the currently selected color, while white portions are unaffected. Colored portions of the picture are changed according to the following table:

Existing Color	Paint Color	Resulting Color
Green/Orange	Green	Green
Purple/Blue	Purple	Purple
Green/Orange	Orange	Orange
Purple/Blue	Blue	Blue
Green/Orange	Purple/Blue	White
Purple/Blue	Green/Orange	White

'\$' In this mode, whites are changed to colors, blacks are unchanged, and colors are changed according to the following table:

Existing Color	Paint Color	Resulting Color
Green/Orange	Green	Green
Purple/Blue	Purple	Purple
Green/Orange	Orange	Orange
Purple/Blue	Blue	Blue
Green/Orange	Purple/Blue	Black
Purple/Blue	Green/Orange	Black

'X' This is complement mode. The current setting of the color does not apply. This mode is particularly fascinating since the picture will keep changing forever. The colors on the picture are complemented as follows:

Existing Color	Resulting Color
Black	White
White	Black
Green	Purple
Purple	Green
Orange	Blue
Blue	Orange

4.2.11 Wraparound Control - 'W' key

When you first enter painter Power Advanced, the wraparound is off. To turn it on, hit the 'W' key. When the wraparound is on, an inverse 'W' is displayed. When the wraparound is off and the brush goes off one edge of the screen, it will reappear on the opposite side, but it will not leave a trail, as it would were wraparound on. This means that the brush has gone onto the extended screen (see section 4.2, discussion of screen location +xxx, +yyy). To get the brush back onto the normal screen, it must either wraparound the extended screen (whose dimensions are -512 to 511 horizontal & vertical), or it must come back onto the screen by being directed in the opposite direction from which it left the screen. Sometimes you may lose the feel of where the brush is on the extended screen. In this instance, you can either guide it back using the screen location shown on the first line of the control display, or you can force the brush back onto the picture by hitting the 'B' key (see section 4.2.17). Turning the wraparound off will also force the brush back onto the screen.

4.2.12 Locate Mode- -'L' and '/' Keys

Locate is used in two ways. When a pattern is being created (see section 4.2.2), Locate is used to locate the position of the next point in the pattern. This is useful for creating segmented patterns, such as words in which the letters are separate. When painting, Locate is used to locate the position on the screen where painting is to resume. This is very useful for selective painting, when you wish to paint a little here and a little there. Used in conjunction with Visualize and Quickstroke features, you can precisely place brushstrokes on your picture.

When Locate is set on, control over brush movement is relegated to the paddles or keyboard, depending upon which was used the last time Locate was used. To switch control from the keyboard to the paddles, hit the '/' key. To use the keyboard, hit the V,M,G,J or H keys depending upon which way you want the brush to go. When you turn Locate off, the brush will resume the movement that it was following prior to your turning Locate on. Likewise, when you turn Locate back on, it will resume the movement that it was following prior to turning Locate off.

4.2.13 Visualize Mode - 'V' Key

Visualize mode is used to visualize the direction the brush will take if a quickstroke is executed (see next 2 sections). When visualize is turned on, the current quickstroke is shown superimposed on the screen. If Locate is on and Stop is off, then you can use the paddles or keyboard to position the quickstroke at a strategic place on the screen. If Locate is off, then the quickstroke will remain at the current screen location. If Stop is off and Quickmode is on (see next section), then the quickstroke will be shown changing constantly according to the current stroke. For instance, if the current stroke is the paddles, the quickstroke will change its shape according to the setting of your paddles. The point of this visualization of the quickstroke is to allow you to quickly visualize a motion and to then execute it. It is reasonable to think of it as an artist imagining what a brushstroke in a certain part of his painting would look like.

4.2.14 Quickstroke Entry Mode (Quickmode) - 'Q' Key

Turning Quickmode on allows the quickstroke to be changed provided that Visualize is on and Locate is off. Turning Quickmode off has the effect of freezing the current quickstroke.

4.2.15 Executing a Quickstroke - ';' and '+' Keys

You may cause Painter Power to execute the current quickstroke at anytime by hitting the ';' or '+' keys. Execution of the quickstroke will proceed regardless of whether Stop, Visualize or Locate are on. When a quickstroke is executed, the brush is moved along the quickstroke from the current screen location to the end of the quickstroke. When the ';' variety of quickstroke is used, the program resumes whatever it was doing before when it reaches the end of the quickstroke. When the '+' variety of quickstroke is used, the program resumes in the same fashion, but at the screen location where the quickstroke began. If the picture screen is displayed, then the brush will be painted onto the picture when you execute a quickstroke, regardless of whether the brush is up or down (provided that the brush is not off the edge of the normal screen). If the monitor screen is displayed and you are creating a pattern, then the quickstroke will become part of the pattern.

Note: Use of the '+' type of quickstroke alters the screen location saved with the 'G' key (see section 4.2.16).

Note 2: During execution of a quickstroke all keyboard presses are ignored.

Since execution of a quickstroke can take place regardless of what you are doing with painter Power, quickstrokes can play a role in a variety of painting procedures. For instance, let's say that you would like your brush to be painted along a diagonal, but to occasionally have it take a jog to the right. To set this up, you would turn Visualize and Quickmode on, and hit the 'J' key to form a quickstroke going to the right. Then turn Quickmode off to freeze the rightward jog, turn Visualize off to see your brush instead of the quickstroke, and hit the 'G' and ctrl-y (set direction = Left, and add one up, so that the direction is diagonally toward the upper left hand corner of the screen). Now your brush should be moving diagonally, and even painting if the brush is down. Now, whenever the fancy strikes you, hit the ';' key to call forth the rightward jog. The brush will go right for the length of the quickstroke, and will then resume its diagonal journey. If you wanted to do the quickstroke and then resume the diagonal at the same point, you would use the '+' type of quickstroke.

4.2.16 & 4.2.17 Setting and relocating to a Screen Location for Brush - '9' and '0' Keys

Whenever you hit the '9' key, the program sounds a 'bloop' and remembers the current screen location. When you subsequently hit a '0', the program immediately moves the brush to this screen location, regardless of what mode you are in or if Stop is on. This feature has a number of uses. For instance, if you wished to execute a series of different brushstrokes radiating out from a single screen location, you would set the screen location by hitting '9'. For each brushstroke, you would set the desired direction using the keyboard or paddles and turn Stop off until the desired stroke was completed. You would then turn Stop back on, hit the '0' key to return to the starting location, and set the direction for the next stroke, and so on. The '0' key is also useful for forcing the brush back onto the screen when the wraparound is off and the brush is lost somewhere off on the extended screen.

4.2.18 Setting a Return Point While Making a Pattern - 'I' key

While creating a pattern, you may tell the pattern to remember the current point in the pattern in order to resume creation of the brush at that point. An example of this would be creation of the letter 'H', in which it is helpful to be able to relocate to the middle of the first upstroke in order to draw the cross bar. When you hit the 'I' key, Painter Power confirms the hit with a blip sound.

4.2.19 Resuming Brush Creation at Return Point - 'O' Key

Hitting the 'O' key while creating a pattern causes to resume entry of the remainder of the brush at the point in the pattern specified at the time 'I' was hit.

4.2.20 Brush and Quickstroke Editing - Right and Left Arrow Keys

While creating a pattern, you may go back one point by hitting the left arrow key. Conversely, you can hit the right arrow to skip forward in the pattern. When in visualize mode, you can use the left and right arrows to reduce/expand the number of points in the quickstroke. This feature is only useful when quickmode is off, since when Quickmode is turned on, it cancels out any effect these might have had.

When painting with a brush, the arrows can be used to reduce/expand the number of points in

the brush. The left arrow causes points at the beginning of the brush to be eliminated.

4.2.21 Temporary backup and restore of picture - ':' and '-'

While you are painting, you may create a copy of your picture so that you can try out an effect without risking ruining your picture. Pressing the ':' key saves a copy of your picture in hi-res page 2. To restore this picture, hit '-'. While your picture is backed up, it is vital that you not turn Paint off and transfer to the monitor screen, as your backup copy will be overwritten. You should also avoid returning to the Set-Up Menu while your picture is backed up.

4.3 Creating Patterns Using Math Functions - Math Menu

The Math Menu allows you to use the computer to create curved patterns based on mathematical functions that would be impossible to create using the paddles or keyboard. These patterns can then be used as strokes or as brushes.

The procedure for computing a pattern is to select the type of curve you would like and then to specify the parameters that will affect the shape of the curve and the number of points it will contain. The Math Menu will then compute the curve and show it to you using hi-res page 2. If you don't like it, you can go back and try a different curve and/or a different set of parameters. If you like the curve, you tell the program in which of the eight patterns you would like it to put the curve. It then pokes the curve into the selected pattern so that it will be available when you return to the Set-Up Menu and Graphics.

If you select a curve and then change your mind, you may enter the keyword 'ERR' in response to any of the questions regarding the curve, and you will be returned to the point of curve selection.

The following paragraphs describe the parameters that the Math Menu requests for each of the 6 types of curves.

Beginning and Ending Angles

If you select beginning angle = 0 and ending angle = 360, then each of the curves will be computed for one cycle. For example, if you select a circle as your curve, then a complete circle will be generated. If you selected 0 thru 180, only half a circle would be generated. You may select any range of angles. Each multiple of 360 is one cycle of the curve. That is, if you selected 0 thru 720, two cycles of the curve would be plotted. However, there is no purpose in specifying more than one cycle for a circle, flower petals or an ellipse since additional cycles would be the same as the first cycle. Additional cycles are different for the spiral, sine and cosine. For the spiral, each cycle is one more revolution, while each additional cycle is an additional wave for the sine and cosine.

You should try out different combinations of beginning and ending angles for each of the curves to get a feel for them. You may also specify that the beginning angle be larger than the ending angle. This will cause the pattern to be plotted backwards.

Number of repeats

The number of repeats is the number of times you want the program to compute the curve for the specified beginning and ending angles. For example, if you selected a circle with beginning and ending angles equal to 0 thru 180, with 3 repeats, then the curve generated would be 3 half-circles (semi-circles) end to end. Each repeat begins where the previous repeat left off.

Number of Points per Repeat

This number dictates how spread out the points of the pattern will be, since the more points, the closer the spacing. The maximum number of points per pattern is 254, so the number of points per repeat must be less than or equal to 254 divided by the number of repeats. Typically, you should use about 150 points for the entire pattern.

Plot Vertically or Horizontally?

A vertically plotted ellipse is a football on end. A vertically plotted sine or cosine looks like a snake going from the bottom of the screen toward the top. A vertically plotted circle and spiral are plotted starting from the top going downward, and then back toward the top. A vertically plotted flower petal has the point of the bottom-most petal pointed toward the bottom of the screen. Horizontal plotting is the opposite of the above.

Scale

The scale is the maximum number of points that the curve will span. The larger the scale, the greater the spacing between the individual points of the curve. The Painter Power screen is 120 vertical by 256 horizontal. Therefore a curve of scale 64 will have the feel of occupying about 1/4 of the screen. You may specify a scale such that the curve is greater than the screensize. This can be used for some interesting effects.

Pattern Number (1-9)

If you specify pattern 0, the curve will not be poked into one of the patterns. Otherwise, the Math Menu will poke your curve into the specified pattern. Pattern number 9 is the quickstroke pattern, so that you can create a quickstroke that is a curve. If you specify the quickstroke, then when you return to the Set-Up Menu, you must set the Stroke sizing to one of the paddles (see section 4.1.5) so that the size of the quickstroke can be adjusted to the number of points in the math pattern.

4.3.1 Circle (Option 1)

When computing a circle, there are no special parameters that need be entered. Various effects can be obtained by adjusting the beginning and ending angles and selecting more than one repeat. For instance, to create a pattern looking like a coil or spring, select 0 thru 270 as the beginning and ending angles, and set the number of repeats equal to the number of coils you want.

4.3.2 Flower Petals (Option 2)

Choose the number of petals that you wish your flower to have. Then select the regular

parameters.

4.3.3 Spiral (Option 3)

For a spiral, there are no special parameters. However, the selection of the regular parameters greatly affects the type of spiral you will get. For many rotations, you should select a large range of angles, such as 0 thru 10000. For a single rotation, select 0 thru 360.

For a densely packed spiral, with the appearance of circles spiralling inward, select a small-medium scale (10-90), with a large number of points per repeat (80-255).

For a spiral to look like a pinwheel, select a large number of revolutions (beginning angle 0, ending angle 1000-20000), with about 20 points per revolution. To figure the number of points per repeat for such a spiral:

Number of points = 20 times (Ending angle -Beginning angle)

360

4.3.4 Ellipse / Deformed Ellipse (Option 4)

An ellipse is an oval, either resting on its side or upright. A deformed ellipse is a circle with a certain number of indentations or lobes. By adjusting the fatness factor and the number of lobes, a great range of patterns can be generated, from a simple oval to starburst and cookie cutter shapes.

You always select beginning and ending angles 0 thru 360 for any kind of ellipse. Also the number of repeats is always one. It is best to select a large number of points per repeat so that you get a higher density of points in the pattern.

The fattest ellipse you will get is fatness factor 99. The skinniest is fatness factor 1. If you select more than one lobe, the fatness factor will effect the fatness of each lobe.

The number of lobes is the number of bumps or points that will be on the pattern. If you select low fatness factor, you will get points or spikes, while with a high fatness factor you will get bumps.

4.3.5 Sine (Option 5)

The amplitude is the height of the bumps on the sine wave. For a spiky appearance, select amplitudes of 5-10. For a smooth appearance, 1-4. As with any of the curves, you may plot a pattern from just one portion of the sine curve by selecting a limited range for the beginning and ending angles, for instance beginning at 20 and ending at 80. By specifying more than one repeat, you will get this portion repeated, end to end a number of times.

4.3.6 Cosine (Option 6)

The amplitude selection is identical to the sine. The only difference between cosine and sine is how the curve starts. The cosine starts down and comes back up, while the sine starts in the

middle, goes up, down past the starting point and back up to the middle again.

4.4 Disk Menu - Using Disk to Store/Retrieve Patterns & Pictures

The numerical selections on the Disk Menu operate in the same way as the disk commands on the Program Selection (section 2.0). The Disk Menu gives you the added ability to save and restore patterns. This selections related to this capability are discussed below while you are referred to sections 2.1 thru 2.5 for the other selections.

4.4.1 Loading a Pattern

This selection allows you to load a previously stored pattern into one of the nine patterns. The ninth pattern is the quickstroke, and if used, you should set the stroke size to one of the paddles upon returning to the Set-Up Menu (see section 4.1.5) in order to adjust the size of the quickstroke to the exact size of the retrieved pattern. The filename extension used on single patterns is '.PAT'.

4.4.2 Load a Pattern Set

This selection loads patterns 1-8 from a previously stored pattern set. The filename extension used on pattern sets is '.SET'.

4.4.3 Load a Picture

See section 2.3.

4.4.4 Save a Pattern

This selection allows you to save one of the nine patterns on disk. The ninth pattern is the quickstroke. When you save a pattern on disk, you may reload into any one of the other nine patterns. This is a convenient way of copying patterns.

4.4.5 Save a Pattern Set

This selection saves patterns 1-8 in a disk file with the filename extension '.SET'.

4.4.6 Save a Picture

See section 2.2.

4.4.7 Delete a Disk File

See section 2.5.

4.4.8 Disk Catalog

See section 2.4

4.4.9 Peek at Picture

See section 2.1.

4.5 Use of Painter Power Advanced Features for Various Effects

Each of the following sections describes how to use certain combinations of features to achieve various graphic effects. These effects can be applied at different stages in the evolution of a painting. For instance, one might be used to initially set up a background texture, while another might be used at the end of a painting to blend different areas.

Since Painter Power allows you to create any sort of pattern, and then to use it either as a brush or as a stroke, there are many many possibilities. Patterns extending across the screen can have a more picture wide effect, while small localized brushes moved in small area can be used for detail.

4.5.1 Hold/Set/Reverse Horizontal and Vertical Steps

This section describes the basic use of the keyboard for controlling the creation and movement of patterns.

Creating a Staircase Pattern

Get to the monitor screen by hitting the 'P' key, set the speed to 'S'low, and hit the 'M'ake pattern key. Hit the 'V' key repeatedly to create the vertical part of the step, and the 'J' key for the horizontal part. To create evenly sized steps, watch the BRGIZ (brush size) indicator on the control display. Each time you add a point, one will be added to the brush size. When you are done, hit the 'M' key. You may then use this staircase as a brush. Or by returning to the Set-Up Menu, you may use it as a stroke and select another pattern as a brush. This will cause your brush to follow the movement of a staircase.

Creating a Zig-Zag Pattern

Get to the monitor screen and 'M'ake pattern mode as in the above example. Hit the 'Z' and 'X' keys so that both 'Z' and 'X' are displayed in inverse on the control display. This means that the horizontal and vertical components are under control of the keyboard (see sections 4.2.5-4.2.7). Set the speed to whatever you are comfortable with. In order to understand how to make different zig-zags, you must observe the next vector setting in the upper left hand corner of the control display. The first number listed is the horizontal component, the second the vertical (see section 4.2.1). Set both of these to 0 by hitting the 'H'old key. Then set the horizontal and vertical components as you wish by holding the Control key down and hitting Y and N to add and subtract from the

vertical component, J and G to add and subtract from the horizontal component. Each different combination will give you a different diagonal. When you have found a diagonal you like hit the 'M' key twice to reinitiate the entry of your pattern. Each time you wish to zig, hit the ',' key. Each time you wish to zag, hit the '.' key again. To zig-zag vertically, use the ',' key instead. Or you may use both keys. If you observe the next vector setting, you will see that each time you hit the ',' key, the horizontal component is reversed, and likewise for the '.' key and the vertical component.

Once you have entered a zig-zag pattern that you like, you can paint with it. As before, you may use the ',' and '.' keys to make your zig-zag brush do zig-zags. For especially interesting results, change the diagonal with which the pattern was originally made. Alternatively, you may control the motion of your brush using the paddles or using a pattern. See the following section.

Painting Zig-Zags

Create some sort of brush, preferably a smaller one. Then get to the picture screen by hitting the 'P' key. As in the above section, use the 'Z' and 'X' keys to lock the horizontal and vertical components. Then hold the control key down and use the V,G,M and J keys to get the brush moving on a diagonal. Put the brush down with the 'U' key. Station two fingers from your right hand over the ',' and '.' keys, and as many fingers as possible from your left hand over the color keys, 1-6. Use the right hand to cause the brush to zig and zag, and the left hand to change the colors.

Additional Uses of the Keyboard Vector Controls Hold/Set/Reverse

If you set both the horizontal and vertical vectors as above, you will be mostly confined to zig-zag types of brushes and movements. You may, however, elect to control just the horizontal or the vertical vector and allow the other to be controlled by the paddles or another pattern. For instance, you may create a wavy pattern or movement by setting the horizontal component to one, and varying the vertical component using the up/down paddle. To do this, the current stroke (item 3 on the Set-Up Menu) must be set to the paddles (see section 4.1.3). You can take this example one step further by entering this kind of wavy pattern, returning to the Set-Up Menu, assigning the wavy pattern to be the current stroke, and assigning a different pattern to be the brush. After returning from the Set-Up Menu, turn the hold horizontal and vertical controls off ('Z' and 'X' keys). Your brush will then move along the wavy pattern. You may then use the ',' and '.' keys to tell the program to reverse the horizontal/vertical movement of the wave. See sections 4.5.9 and 4.5.10 for further applications of keyboard control.

4.5.2 Using the 5 Painting Modes to Connect/Blend Areas of a Picture

The last 3 of the 5 painting modes (see section 4.2.10) serve well to integrate the different areas of a picture. The reason they are good for this is that instead of replacing the color already existing, they interact with the color that is there based on the current color selection (with the exception of complement mode, which does not depend upon the color selection). Thus the form or shapes present in an area of the screen are retained while only the color information is altered. Since the color is only altered where you move the brush, you can connect areas of the a picture by moving the brush over parts or all of the areas you wish to connect.

For example, let's say that you wished to give your picture a darker tone. For this, you would use paint mode 4, selected with the '\$' key. You should use a fairly small brush so that you don't inadvertently affect too much of an area. Direct the brush to the areas which seem to be too bright. Referring to the chart in section 4.2.10, select the color which will optimally interact with the colors that are on the screen. Then put the brush down and direct it over the areas you wish to change. You should be careful not to go over the same area with 2 different colors from the same color family, such as blue and orange, since the blue and orange will combine to form black, and you will lose the detail that used to be in that area of the picture. Green and orange, on the other hand, will replace one another and no detail will be lost.

Varieties on this technique of blending can be had by moving the brush such that it skips, or designing a brush that has gaps instead of a solid brush. You may also use the complement paint mode (key 'X'), but you must be careful since this painting mode can reduce your picture to a detailed mincemeat.

4.5.3 Controlling Texture

The texture of your painting is controlled by:

- 1) The simplicity of the brushes you use.
- 2) The simplicity of your strokes.
- 3) The number of times you change colors in the painting.

By adjusting any or all of these, you can achieve a variety of textures. For instance, by using a simple brush moving in a single direction with occasional color changes, you create a simple pattern with a solid texture. If you go over the same area again with different colors, and skip lines, then the form remains the same but the texture becomes more detailed. If you create a brush which has skips in it, then almost any way you move it you get a detailed texture. And if you change colors frequently you will also get a detailed texture. Since the complement painting mode changes colors automatically, it is an ideal way to complicate the texture of an area. You can paint an entire picture using complement mode. Just start with a blank screen and select painting mode 'X'. The more the brush moves around the screen, the more complicated the texture will get.

4.5.4 Painting with a Changing Brush

This is a very special effect whose outcome is quite hard to exactly predict. The first step is to set the brush size to correspond to one of the paddles using Set-Up Menu selection 4 (section 4.1.4). Set the paddle so that the brush size indicator is about 50. This is a good starting value which you may experiment with later. Go back to the monitor screen after making sure that the current stroke is set to the paddles (Set-Up Menu selection 3 (section 4.1.3). Then get into 'Make pattern mode. Use the paddles or keyboard as you would usually when entering a pattern. The program will show the current brush being changed according to the changes you make with the paddles/keyboard. The difference will be that the entire brush will be shown, that is, the number of points in the brush that corresponds to the paddle setting. The motion that you will see is caused by the fact that the 'tail' of the brush (the portion that has not yet been changed) moves as you change the 'head' of the brush.

After you have gotten the feel for this effect, transfer to the picture screen and put the brush down. The wagging tail will now leave a trail. Each time the brush starts over from the beginning, the program will sound a blip. Try different paddle settings for different size brushes. Some of the best graphics can be gotten by entering a spiral with the brush up (a joystick is best for this), and putting the brush down just at the end of the spiral. The spiral will then unwind leaving a spectacular trail.

For even more bizarre effects, you may use Locate and Quickstrokes while painting with a changing brush (see section 4.5.8). You may also use a pattern as the current stroke.

4.5.5 Exploiting the Apple's Hi-res Color Plotting Limitations

As explained on page 19 of the Apple II Reference Manual, there are limitations to how colors may be placed on the screen. Due to this limitation, you may notice that when you have selected green, orange, blue or purple as the paint color, that the entire brush is not always painted. On the other hand, when white or black is the paint color, you may see fringes of orange/blue or green/purple, depending if you have selected white/black II or white/black I. Generally speaking, it is the latter limitation which can be exploited to produce the prettiest effects.

To explore this effect, create a brush which is a solid vertical line. Then go to the picture screen, set the background color to black (6), and the paint color to white (3). When you get the brush moving across the screen, skipping every other point (horizontal component = 2), you will notice that the computer is painting either orange or blue, but not white. If you skip 2 out of 3 points (horizontal component = 3), then in 3 scans across the screen you will get a variety of blue/orange stripes before you end up with a solid white band. Try using complement painting mode ('X' key) to get a continually shifting screen. This limitation can also be exploited further in this way by using strokes and brushes whose combined effect causes dots to be plotted at a minimum of every other point.

4.5.6 Combining Several Patterns into One Pattern

This procedure is useful for creating patterns to be used as specialized brushes or strokes. For instance, you might want to combine a circle, generated using the Math Menu, with a vertical line to create a lollipop pattern which could then be used as a stroke. This is best done using 'S'ail speed. Return to the Set-Up Menu and select as the brush the pattern in which you wish to create the lollipop (Set-Up Menu selection 2). Then select the first of the two patterns to be joined as the stroke (Set-Up Menu selection 3). Return to the monitor screen and enter 'M'ake pattern mode. Hit the space bar repeatedly until the desired portion of the first pattern has been entered. If you go too far, you can use the backarrow key to backup. Return to the set-up menu and select as the stroke the second pattern to be joined. Return to the monitor screen and use the space bar as before to enter the second pattern. When you have finished, hit the 'M' key again to finish 'M'aking the pattern. You may use this procedure to join several patterns or even to join the same pattern several times. Be sure to remember that the largest pattern may contain only 255 points.

If you wish to leave a gap between the patterns being joined, use Locate mode to set the beginning point of the second pattern (see sections 4.5.8 and 4.2.12).

4.5.7 Relating Color with Motion

This effect utilizes the options for selection of color by paddle and creation of a custom color table (see sections 4.1.6 and 4.1.7). The way in which you relate color with motion is to use the identical paddle for determining both the color and the horizontal or vertical direction. Both the horizontal and vertical paddles create movements in the range of -4 to +4. These correspond to 8 color numbers, as in the table below. The table shows the colors of the color table as set when you first enter the Set-Up Menu. The color table feature allows you to set these colors as you wish. Therefore, you may find it useful to copy this table onto a piece of paper, assign your own colors to the movements, and then use the Set-Up Menu to alter the color table.

Vertical Movement	Horizontal Movement	Color Number	Initial Color Setting	Example
+3	-3	1	Green (1)	Blue (5)
+2	-2	2	Purple (2)	Blue (5)
+1	-1	3	White I (3)	Blue (5)
0	0	4	Orange (4)	Black II (6)
-1	+1	5	Blue (5)	Orange (4)
-2	+2	6	Black II (6)	Orange (4)
-3	+3	7	White II (7)	Orange (4)
-4	+4	8	Black I (8)	Orange (4)

Let's say that you wished to have the paint color be blue when the brush was moved up, black when it was on the level, and orange when moved down. You would set color numbers 1 thru 3 to 5 (for blue), color number 4 to 6 (for black II), and color numbers 5 thru 8 to 4 (for orange). You would set the color selection (Set-Up Menu selection 6) to paddle 2, the vertical paddle, and the current stroke to the paddles (Set-Up Menu selection 3). All that would be left to do would be to create a brush that would maximize the effect of these settings. A simple brush of this sort would be a vertical line.

4.5.8 Using Quickstrokes and Locate to Create Patterns

The usage of quickstrokes as described in sections 4.2.13 thru 4.2.15 may be applied in a similar manner to the creation of patterns. This allows you to repeatedly enter the same quickstroke into a pattern, or to create individual quickstrokes and enter them one by one. Locate mode, as described in sections 4.2.2 and 4.2.12, allows you to locate a place where subsequent entry of points in the pattern will resume. Used together you can create a segmented pattern of quickstrokes.

Let's say that you wished to create a pattern containing the same stroke, with each stroke separated by a gap of 20 points. First you would create a quickstroke by turning Visualize ('V' key) and Quickmode ('Q' key) on. Once the desired stroke was created, you would turn these off, set 'S' nail speed and 'M'ake pattern mode. To enter the first stroke, you would hit the ';' key to execute the quickstroke. To leave the gap of 20 points, you would turn 'L'ocate mode on and use the G or J keys to step 20 points to the left or right. At this point you would hit the ';' key again to get the second stroke. There would be no need to turn Locate off since the quickstroke would be enter

regardless. You would then move over another 20 points, and so on. After you entered the fourth stroke, you would hit 'M' key to terminate making of the pattern.

If you wished to enter four different strokes into the pattern, you would create the quickstroke each time by using Quickmode and Visualize. When you had the desired stroke, you would hit ';' to enter it into the pattern. Then, as above, Locate could be used to set the gap of 20 points. Then you would create the second quickstroke, and so on.

4.5.9 Using Keyboard Override with Math Patterns

Keyboard override refers to the fact that use of the keyboard control keys Z,X,V,G,J,N and H overrides the current stroke. Thus if the current stroke is a pattern computed by the Math Menu, you may use these keys to override either or both of the horizontal and vertical components of the pattern. Generally it is only useful to override one of the two components since if both are overridden, the math pattern is totally suppressed and the resulting movement is a straight line.

If the current stroke is one of the Math patterns, and is other than the sine or cosine, then overriding one of the two components results in the brush moving in one direction along a bumpy line resembling a sine or cosine curve. By setting the overridden component using the control and V,G,N and J keys (see section 4.5.1), you may spread or shrink the distance between the bumps. This can be used to produce all sorts of mountain or snakelike effects.

If you really like the movement resulting from overriding one of the components, you may save it as a quickstroke or create a whole new pattern from it. As a quickstroke, the movement can be executed at any time with the ';' key, enabling you to put a snake here and a snake there. If saved as an entirely new pattern, the snake can be used as a brush or a stroke.

The reverse horizontal (',' key) and reverse vertical (',' key) features can be used in conjunction with the math patterns to make them reverse their motion. Thus you can make the brush snake backwards and forwards, and reverse the direction of the bumps.

4.5.10 Experimenting with Large Keyboard Vectors

The use of large keyboard vectors is an extension of the use of the keyboard to control movement, as described in section 4.5.1. The word 'large' is used to describe vectors that are much larger than the normal range of the paddles, -3 to +4. Large keyboard vectors are set by turning on hold horizontal and/or hold vertical ('Z' and 'X' keys), and then repeatedly striking the V,G,N, and J keys while holding down the control key. This causes the program to paint the brush with large gaps in between each painting. With wraparound on ('W' key) this causes the screen to be rapidly covered with the current brush.

For example, turn hold horizontal and hold vertical on. Hold the repeat, control and V keys down until the vertical component is at least 15 or greater. Set the horizontal component to a low number, such as 2. The brush will then be repeated rapidly (especially if you have set 'B'litz speed) in a vertical column which will slowly be scanning to the right. Try changing the horizontal and vertical components, clearing the screen and seeing the different pictures that result.

Use of large keyboard vectors is especially interesting when used in conjunction with the complement paint mode ('%' key). You will get an ever changing picture which will go through complicated phases yet will amazingly always restore itself to what it was when you turned complement mode on (provided you don't change anything while it is going through its phases).

5.0 Creating a Slide Show

Slide Shows consist of a list of slides with optional titles that may reside on either or both disks. To create a slide show, you enter the disk file name of each slide (you must include the filename extension '.PIC'),

and finally the name and disk number where the file containing the list of slides is to be stored. Once this list is stored, you may playback your slide show at anytime (see section 6.0).

5.1 Entering Slides

To enter the next slide, specify option A. To reenter the last slide (in case you made a mistake), specify option B. To reenter the entire slide show from the beginning (if you made a big mistake), then specify option C. If you have entered all of the slides, specify option D and see the next section.

When you enter a slide, you must type the full filename, including the .PIC extension. If the slide resides on a different disk, follow the slide file name with a comma and 'D1' or 'D2', depending if the file is on disk 1 or disk 2. Enclose the entire expression in quotes. The program will load the slide and show it to you. When you have thought of a name for the slide, hit any character and enter the name. If you have no name, just hit return. Specify the number of seconds that you wish to show this slide in response to the next question.

5.2 Saving a Slide Show

When you have entered all of your slides, select option D. The program makes sure that you wish to do this in case you inadvertently hit the letter D. So type Y if you are really done. In response to the 'Slideshow Name?' question, enter a disk filename for your slideshow. If the file will reside on a different disk, follow the filename with a comma and D1 or D2, for disk 1 or disk 2. Be sure to enclose the entire expression in quotes. The program will then save the list of slides in the selected file.

Note: The extension '.MOV' will automatically be added to the filename you specify for your slideshow.

6.0 Running a Slide Show

To run a slide show, enter the name of the file containing the list of slides. Do not include the '.MOV' extension. If the file resides on a different disk, then follow the filename with a comma, and D1 or D2, for disk 1 or disk 2. Make sure to enclose the expression in quotes. After the program loads the file, insert the disks containing the slides into the appropriate drives.

6.1 Verifying and Running a Slide Show

Before running the slide show directly, you may wish to verify that all of the slides are present on the disks that you have prepared. To do this, select the Verify option. The program will look for each slide and will report those it cannot find. When it has cycled through the entire slide show, it will ask you again if you wish to verify the slide show.

When you run the slideshow directly, missing slides will simply be omitted from the sequence. The entire sequence will be repeated ad infinitum until you hit the control-C key, which will return you to the Program Selection.

6.2 Freezing a Slide

If in the course of a slideshow you wish to freeze a slide, just hit the 'S' key as soon as that slide appears on the screen. Hit any other character when you wish to continue with the remainder of the sequence.